BSC 307 5-E Model Lesson Plan

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| **Title:**  Alien Enzyme Invasion | **Grade Level:**  **9** |
| **Objectives:** TSWBAT:  1. Observe that enzymes are not used up in reactions  2. Investigate how changes in the environment can affect enzyme activity  3. Define an enzyme and a substrate | |
| **Illinois Learning Standards:**  ISLS stage I 12 A 1. Apply scientific inquiries or technological designs to explain metabolic processes within cells and between organisms and their environment, explaining gas exchange, food processing, transport, excretion, locomotion, body regulation, and nervous control, investigating enzyme actions in various reactions, or describing the applications of the polar nature of water and the pH index in biochemical reactions.  ISLS stage I 12 A 2. Apply scientific inquiries or technological designs to analyze the cellular organelles and functions, using different microscopic techniques, explaining functional processes chemically and structurally (e.g., osmotic, active and facilitated transport, enzyme action and protein/lipid/carbohydrate metabolism). | |
| **Engagement:** Students will be presented with a document for the M.I.G. (Men in Grey) that an alien invasion is on the horizon. They have been entrusted to find a way to defeat the aliens and prevent the invasion. They are given samples of an enzyme vital to the alien’s biological functions which if inhibited well cause them to be unable to live and thus not invade Earth. | |
| **Exploration**: Students will receive test tubes filled with the sample alien tissue (catalase) and subject it to different environmental conditions and record the effects of enzymatic activity each condition had on the catalase. | |
| **Explanation:** During post lab discussion, students will participate in a discussion about what may have caused the results that they obtained. Discussion will be facilitated to include the importance of enzyme substrate affinity, denaturing of enzymes and how important enzyme structure is for carrying out enzymatic reactions | |
| **Elaboration:** Lead into how some conditions such as lactose intolerance have to do with enzymatic reactions. Specifically, how missing specific enzymes prevents the digestion of certain foods. This will lead into more enzyme substrate affinity and that enzymes are very specific in what molecules they react with. | |
| **Evaluation(Assessment Strategies):**  Students are assessed based on their completion of the lab activity and worksheets. | |
| **Rationale:**  Enzymatic reactions occur all throughout our bodies, mostly known in our digestion process. In these reactions, the enzymes remain while the substrate is turned into a product. This lab gives an intriguing look at basic enzymatic functions as well as showing students how important environmental factors can be on the function of an enzymes ability to carry out its job. It also creates a visual memory for students. | |
| **Resources:**  Agee, S. (2011, March 03). *Liver Stinks*. Retrieved March 23, 2011, from Science  Buddies: http://www.sciencebuddies.org/science-fair  projects/project\_ideas/BioChem\_p030.shtml  Fuentes, A. (unknown). *Enzyme catalase*. Retrieved March 23, 2011, from csun.edu:  http://www.csun.edu/~aef21890/coursework/695/science\_kit/enzyme-catalase.htm  Illinois State Board of Education. (1997). Illinois State Learning Standards.  [Online]. Retrieved on March 27, 2011. Available:  <http://www.isbe.net/ils/Default.htm>. | |
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